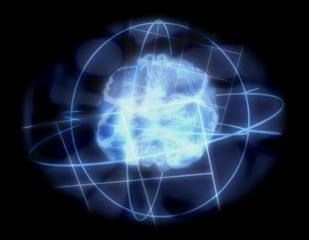
The Effects of Exercise on the Brain

EXERCISE FOR STRESS MANAGEMENT FOR BETTER HEALTH



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MODERN DEFINITION OF STRESS

Stress is experienced when a person perceives that demands exceed the personal and social resources that the individual is able to mobilize.

Stress dogs us like a bad tooth-ache:

There are at least 50 signs and symptoms of stress:

Frequent headaches, jaw clenching or pain; Gritting, grinding teeth; Stuttering or stammering; Tremors, trembling of lips, hands; Neck ache, back pain, muscle spasms; Light headedness, faintness, dizziness; Ringing, buzzing or "popping sounds; Frequent blushing, sweating; Cold or sweaty hands, feet; Dry mouth, problems swallowing; Frequent colds, infections, herpes sores; Rashes, itching, hives, "goose bumps"; Unexplained or frequent "allergy" attacks: Heartburn, stomach pain, nausea; Excess belching, flatulence: Constipation, diarrhea; Difficulty breathing, sighing; Sudden attacks of panic; Chest pain, palpitations; Frequent urination; Poor sexual desire or performance; Excess anxiety, worry, guilt, nervousness; Increased anger, frustration, hostility; Depression, frequent or wild mood swings; Increased or decreased appetite; Insomnia, nightmares, disturbing dreams; Difficulty concentrating, racing thoughts; Trouble learning new information; Forgetfulness, disorganization, confusion; Difficulty in making decisions Feeling overloaded or overwhelmed; Frequent crying spells or suicidal thoughts; Feelings of loneliness or worthlessness; Little interest in appearance, punctuality; Nervous habits, fidgeting, feet tapping; Increased frustration, irritability, edginess; Overreaction to petty annoyances; Increased number of minor accidents Obsessive or compulsive behavior; Reduced work efficiency or productivity; Lies or excuses to cover up poor work; Rapid or mumbled speech; Excessive defensiveness or suspiciousness; Problems in communication, sharing; Social withdrawal and isolation; Constant tiredness, weakness, fatigue; Frequent use of over-the-counter drugs; Weight gain or loss without diet; Increased smoking, alcohol or drug use; Excessive gambling or impulse buying

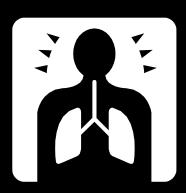
What we know:

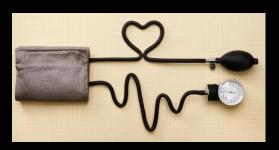


SHORT TERM

HIPPOCAMPUS: Cements the response to the threat into long-term memory PUPILS: Dilate, ready to relay signs of danger to the visual thalamus SALIVA: Decreases as digestive system slows AMYGDALA: Directs HYPOTHALAMUS THYROID GLAND: Raises central and autonomic Incorporates signals nervous systems to trigger an all-systems resting metabolic rate from organs, triggers pituitary gland and nervous system, causing the body's alarm; also stores LUNG: Bronchioles dilate, memory of threat taking in more oxygen major organ systems to prepare for action HAIR: Stands on end PITUITARY GLAND: HEART Blood Produces thyrotropin and adrenocorticotropin. pressure and heart calling the thyroid and adrenal system into action rate spike, infusing brain and muscles SKIN: Vessels constrict, causing chills and sweat with ready fuel ANATOMY OF FEAR SPLEEN: Contracts, pumping to break down Within seconds of perceiving a out white blood cells and glycogen for instant energy threat, the primitive amygdala platelets in preparation for to keep up with higher metabolic rate possible physical injury sounds a general alarm. The adrenal system promptly floods STOMACH AND the body with adrenaline and GASTROINTESTINAL TRACT: Vessels constrict to stress hormones, Nonessential divert blood to muscles physiological processes switch off. Digestion stops, skin chills, BLADDER AND COLON: and blood is diverted into mus-Prepare to void their cles in preparation for a burst of contents in preparation for violent action and emergency action. Breathing possible injury quickens, the heart races, and blood pressure skyrockets, infusing the body with oxygen ADRENAL MEDULLA: Floods while the liverreleases glucose bloodstream with adrenaline and noradrenaline, increasing the level of blood sugar and constricting blood vessels for quick fuel. The entire body is suddenly in a state of high alert, ready for fight or flight.





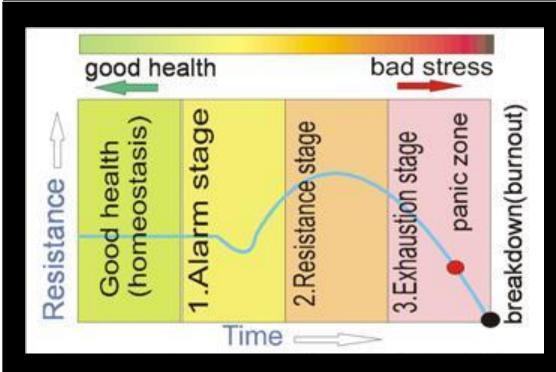






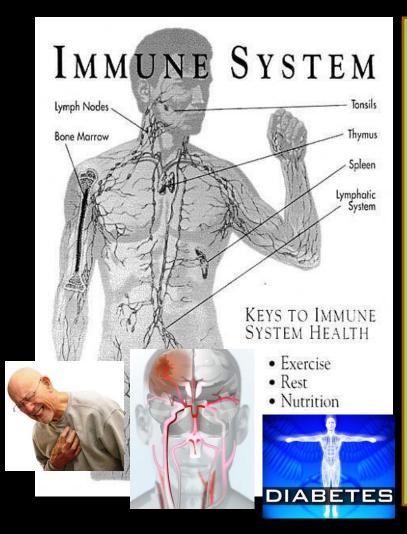
What we know:

- 1. Increased heart rate
- 2. Increasing breathing rate
- 3. Increased blood pressure
- 4. Increased production of sugars, triglycerides, cholesterol
- 5. Blood diverted away from skin and extremities

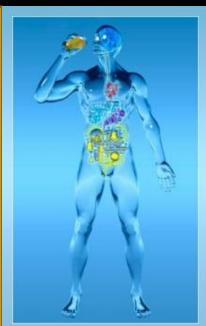




GAS
General
Adaptation
Syndrome



- 1. Corticotrophin Releasing Factor: appetite suppressor!
- 2. Opportunistic diseases: heart disease, hypertension, diabetes
- 3. Sick more frequently





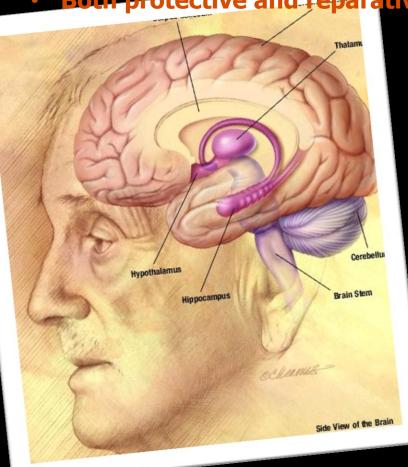
Long-Term Effects of Stress



What we know:

 Exercise causes creation of new neurons in the hippocampus: Brain-Derived Neurotrophic Factor (BDNF)





Hippocampus: short and long term memory and spatial navigation

Hypothalamus: link the <u>nervous system</u> to the <u>endocrine system</u> via the <u>pituitary gland</u>; controls <u>body temperature</u>, <u>hunger</u>, <u>thirst</u>, fatigue, <u>sleep</u>, and <u>circadian cycles</u>

Thalamus: relaying sensation, spatial sense, and motor signals to the cerebral cortex, along with the regulation of consciousness, sleep, and alertness

Cerebellum: <u>brain</u> that plays an important role in <u>motor</u> <u>control</u>, <u>cognitive functions</u> such as <u>attention</u> and <u>language</u>, and in regulating <u>fear</u> and <u>pleasure</u> responses

Brain Stem: brain stem provides the main motor and sensory innervation to the face and neck via the <u>cranial</u> <u>nerves</u>. The brain stem also regulates cardiac and respiratory function. It also regulates the central nervous system, and is pivotal in maintaining consciousness and regulating the <u>sleep</u> cycle.

What we know:

- Humans start to lose nerve tissue at age 30
- BDNF: reinforces neural connections by increasing the number of connections and increases the number of cells: allows us better storage and processing of information
- Physically active people recover from mild depression faster
- Depression is related to low-levels of serotonin and norepinephrine: **EXERCISE** increases these neurotransmitters!

What we know:



Pituitary Gland: The pituitary gland secretes nine <a href="https://hormones.nine.google.com/hormones.google.com/hormones.google.co

Endorphins: <u>neurotransmitters</u> are produced by the <u>pituitary gland</u> and the <u>hypothalamus</u> in <u>vertebrates</u> during <u>exercise</u>, <u>excitement</u>, <u>pain</u>, and they resemble the <u>opiates</u> in their abilities to produce a feeling of wellbeing.

Blood levels of endorphins have been found to increase as much as 5-fold the resting rate after a prolonged bout of physical exercise: (30 mins+)

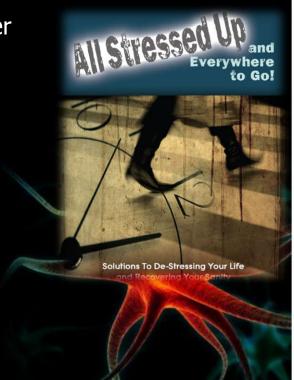
What we all need to do:

- 1. Exercise at least every other day
- 2. Exercise vigorously for those endorphins
- 3. Need to eat healthy
- 4. Practice stress management techniques
- 5. Need to recognize symptoms when under stress

6. Need to have a plan and execute the plan when under







Nutrition

- 1. Once the immune system is harmed, it's a domino effect of problems:
- 2. Body's nutrients are depleted much faster than normal.
- Unhealthy "quick fixes"
 - Good eating habits go out the window
 - Poor food choices exacerbate the stress response
 - refined sugar; processed flour; salt, caffeine-these foods trigger the release of epinephrine/norehinephrine which increases heart rate, blood pressure, and metabolic activity.
 - and metabolic activity.



Nutrition: what can we do?

- 1. Eat a variety of food colors
- 2. Choose foods that are high antioxidants
- 3. Choose organic if possible
- 4. Drink filtered water
- 5. Reduce caffeine consumption
- 6. Avoid modified foods
- 7. Fresh herbs and spices
- 8. Free range meats
- 9. Enough fiber
- 10. Omega-3 oils
- 11. Steam your veggies
- 12. Choose supplements wisely

















Thank You

